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14. ABSTRACT We organized the symposium, "Electronic Transport Properties in the Presence of Density Modulation", in the 10th International Conference of Computational Methods in Sciences and Engineering (ICCMSE 2014), April 4-7, 2014, Athens, Greece. The invited speakers of the symposium and their talks are listed below. Dr. Cayetano Cobaleda (Universidad de Salamanca, Spain) From low mobility graphene to high mobility hBN-graphene heterostructures Dr. Ivan Dmitriev (Max-Planck-Institute, Germany) Transport in zero resistance state Dr. Akira Endo (University of Tokyo, Japan) Measurement of the RF Magnetoconductivity of Lateral Superlattices by Coplanar Waveguide Dr. Zhigang Jiang (Georgia Institute of Technology, USA) Magnetic field tunable Dirac plasmons in graphene nanoribbons Dr. Alejandro Kunold (Universidad Autónoma Metropolitana, Mexico) Magneto transport in 2D electron gases in semiconductor heterostructures Dr. Sungkwun Lyo (Univ. of California - Irvine, USA) Nonlinear Electron Transport and Bloch Oscillations in Low-dimensional Superlattices Dr. Erik Nielsen (Sandia National Labs, USA) An easy recipe for better double quantum dot qubits: just add electrons Dr. Wei Pan (Sandia National Labs, USA) New Quantum Transport Results in Type-II InAs/GaSb Quantum Wells Dr. Madhu Thalakulam (Indian Institute of Science Education and Research, India) Charge Amplification Nearing the Quantum Limit Dr. Michael Zudov (University of Minnesota, USA) Nonequilibrium transport in high Landau levels of 2D systems: recent developments					
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PARTICIPATION SUPPORT FOR THE 10TH INTERNATIONAL CONFERENCE OF
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We organized the symposium, “Electronic Transport Properties in the Presence of Density Modulation,” in the 10th International Conference of Computational Methods in Sciences and Engineering ([ICCMSE 2014](#)), April 4-7, 2014, Athens, Greece. We invited 10 experts in the field to the symposium. They are:

(1) Dr. Cayetano Cobaleda (Universidad de Salamanca, Spain)

Talk: [From low mobility graphene to high mobility hBN-graphene heterostructures](#)

Dr. Cobaleda reported his recent work on quantum transport in ultrahigh quality graphene devices on hBN substrate. Graphene has recently been recognized as a candidate material for next generation nanoelectronics.

(2) Dr. Ivan Dmitriev (Max-Planck-Institute, Germany)

Talk: [Transport in zero resistance state](#)

Dr. Dmitriev reviewed his systematic, theoretical study of a highly unusual quantum state, the so-called zero resistance state, in two-dimensional electron gases. Such a state allows for dissipationless quantum transport; therefore, it holds great promise for realizing quantum computation.

(3) Dr. Akira Endo (University of Tokyo, Japan)

Talk: [Measurement of the RF Magnetoconductivity of Lateral Superlattices by Coplanar Waveguide](#)

Dr. Endo reported his recent experimental work on thermoelectric power of two-dimensional electron gases in the quantum Hall regime. Quantitative results were achieved due to the application of a novel coplanar waveguide technique.

(4) Dr. Zhigang Jiang (Georgia Institute of Technology, USA)

Talk: [Magnetic field tunable Dirac plasmons in graphene nanoribbons](#)

Dr. Jiang reported his recent work on tunable Dirac plasmons in nanostructured graphene. He demonstrated that Dirac plasmons can greatly enhance light-matter interactions in graphene; therefore, graphene may be able to replace noble metals in future nano-plasmonics and nano-optoelectronics.

(5) Dr. Alejandro Kunold (Universidad Autónoma Metropolitana, Mexico)

Talk: [Magnetotransport in 2D electron gases in semiconductor heterostructures](#)

Dr. Kunold's talk was about the spin manipulation in semiconductors, which is a breakthrough on the way to the next generation microprocessor transistors. Such a capability for selectively controlling individual electron and nuclear spin states in quantum dots is crucial for a new generation of spin-electronic devices to mitigate X-ray induced ionization damage.

(6) Dr. Sungkwun Lyo (Univ. of California - Irvine, USA)

Talk: [Nonlinear Electron Transport and Bloch Oscillations in Low-dimensional Superlattices](#)

Dr. Lyo described his theory of Bloch oscillations in two-dimensional electron systems. His theory explains some of Dr. Pan's experimental results, and more importantly, it predicts new effects for future investigation.

(7) Dr. Erik Nielsen (Sandia National Labs, USA)

Talk: [An easy recipe for better double quantum dot qubits: just add electrons](#)

Dr. Nielsen proposed a new device concept for designing/fabricating a qubit for quantum computation. The material system he proposed is an embedded state in silicon; therefore, it can be integrated with current microelectronics technology.

(8) Dr. Wei Pan (Sandia National Labs, USA)

Talk: [New Quantum Transport Results in Type-II InAs/GaSb Quantum Wells](#)

Dr. Pan's talk was about the design & fabrication of Bloch oscillators using a two-dimensional array of quantum dots. The tunable frequency of the device spans from THz to LWIR with a narrow spectral linewidth. This work enhances development of high-power, compact, tunable, sensitive, high-speed and coherent THz radiation sources & detector arrays, which are of interest in high-speed & wide bandwidth space communication and chemical, explosive, concealed weapon and biological agent detection and monitoring.

(9) Dr. Madhu Thalakulam (Indian Institute of Science Education and Research, India)

Talk: [Charge Amplification Nearing the Quantum Limit](#)

Dr. Thalakulam described a charge qubit and the electronic transport properties near the quantum limit. A basic operation of the qubit, namely the charge amplification, was also demonstrated in a realistic environment with $1/f$ noise.

(10) Dr. Michael Zudov (University of Minnesota, USA)

Talk: [Nonequilibrium transport in high Landau levels of 2D systems: recent developmentsAthens](#)

Dr. Zudov's talk focused on the impact of disorder on magnetotransport in two-dimensional electron systems, particularly on the $5/2$ fractional quantum Hall state, a promising quantum state for realizing quantum computation.

All the presentations of this symposium are published online at <http://jianglab.gatech.edu/ICCMSE2014.html>. AFOSR funding is acknowledged on this website.